Marked Up Version Of Amended Paragraphs In The Specification

Paragraphs **[0004]**, **[0013]**, **[0024]**, **[0026]**, and **[0033]** are amended as follows.

[0004] One concern in flip-chip packages is the difference between the coefficients of thermal expansion of semiconductor die 110 and substrate 130. This difference creates mechanical displacement stress on the connections between die 110 and substrate 130. In packaged device 100, underfill 120 between die 110 and substrate [120] 130 strengthens the attachment of die 110 to substrate 130 to help prevent the thermal stresses from breaking the connections between die 110 and substrate 130.

[0013] Another embodiment of the invention is a method for packaging an integrated circuit die. The method includes: attaching the die to a substrate so that conductive traces on the substrate electrically contact contacts on the die; forming a dam on the substrate around the die; and filling a volume between the die and the substrate and between the die and the dam with [a] an underfill material. The dam can be constructed before applying the underfill by placing, depositing, growing, or otherwise accumulating material on the substrate to form the dam. Alternatively, the dam can be preformed to the desired shape and attached to the substrate. The underfill is applied after the dam is in place so that the dam controls the shape and location of the edge of the underfill. Suitable materials for such dams include but are not limited to a material such as a metal layer or feature and a polymer which is filled with property modifying materials such as spheres, fibers or pieces of quartz, ceramic, or metal [spheres or fibers of pieces].

[0024] Dam 240 can be formed on or attached to substrate 230 using a variety of techniques. For example, suitable dam forming techniques include but are not limited to liquid dispense methods, injection transfer molding, and thermocompression transfer molding. Alternatively, dam 240 can be a preformed organic or metallic structure that is formed into the desired shape and then attached to substrate 240 by gluing, staking, or riveting. In one particular embodiment, dam 240 doubles as a stiffener or heat spreader that attaches to substrate 130 to improve the mechanical or thermal properties of packaged device 200. Co-filed patent application No. [Unknown] 09/683,304, entitled "Adhesive Control During

THE PATENT LAW OFFICES
OF DAVID MILLERS
6560 ASHFIELD COURT
SAN JOSE, CA 95120
PH: (408) 927-6700
FX: (408) 927-6701

Stiffener Attachment To Provide Co-Planarity In Flip Chip Packages", further describes attachment of a stiffener and is hereby incorporated by reference in its entirety.

[0026] Generally, the volume of underfill and the height and shape of dam 240 should be selected to ensure that a wetting angle [α"] α' of underfill 220 is less than 45 ° (maximum) from the top surface of die 110 as shown in Fig. 2B. The underfill wetting angle [α] α' to dam 240 should also be less than 45°, thereby ensuring a complete and balanced stress spreader of underfill. Additionally, each region of underfill 220 should be thick enough to ensure minimum shrinkage and maximum retention of the bulk fill allowing creation of the best case material performance and easiest methodology of underfill process across the space between the edge of die 110 and dam 240.

[0033] As noted herein, a dam shapes the edge of an underfill structure in a flip-chip package to reduce stress concentrated around the edge of the die. The resulting flip-chip package has superior planarity of the substrate for better connections of the BGA, superior reliability by avoiding inhomogeneity in the coefficient of thermal expansion and associated stress during thermal cycling, and better mechanical attachment of the die and substrate when compared to conventional [overall] flip-chip packages.

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6560 ASHFIELD COURT
SAN JOSE, CA 95120
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